Washington State Department of Health

ELABORATIONS

News and Issues for Washington's Clinical Laboratories

Volume IX Issue 7 August 2004

Bioterrorism Corner: EBOLA

by Candace Bunch

The WHO recently declared that the Ebola outbreak in Yambio County, Western Equatoria is now contained. Only seven people of 30 reported cases died. At a rate of 23 percent, this was one of the lowest mortality rates in the history of the Ebola virus.

What, you didnít know there was an Ebola outbreak? In 1976, Dr. Ngoy Mushola noted the first outbreak in Yambuku, Zaire (now the Democratic Republic of the Congo), and in Nzara in western Sudan. The virus was named after the nearby Ebola River. The two strains were named Ebola-Zaire and Ebola-Sudan. Later outbreaks occurred in the Congo in 1995 and 2003, in Gabon in 1994, 1995, and 1996, in Uganda in 2000 and most recently in Western Equatoria. As the virus is transmitted by direct contact with body fluids, burial rites that involve the handling of internal organs of corpses have led to many deaths in the past and are being addressed through education. So how do these outbreaks start?

There was a 19-year gap between the first group of four epidemics and the second group of four in 1994-96, and then four more years until the next set. Why? What is the host carrier? According to researchers, the host passes the virus on to monkeys, chimps, gorillas and forest antelopes that are then eaten by humans. Current educational efforts teach avoidance of eating bush meat and dead animals. However, bush meat is a staple among remote forest communities. As evidence, deaths of primates were associated with all the Gabon outbreaks. After the 2003 outbreak, chimp numbers dropped by 89% and lowland gorillas numbers were down 50%. Potentially this is very serious for the gorilla populations as it takes three or four generations to recover to their original numbers. Currently under discussion is the concept of vaccinating these wild primates.

Work continues on investigating the host carrier. Injected bats have survived Ebola during tests but so far bat specimens collected after outbreaks have not shown to have Ebola. Could birds be the natural reservoir? The biochemistry of cell entry is similar between the Ebola virus and bird retroviruses, and genetic testing indicates that they may have a common ancestor. Interestingly, the central African Rift Valley separates the ranges of bird species and also the Ebola outbreaks. Currently, 100 bird species are being tested for evidence of the virus. Primates cannot be the long-term reservoir because they die too quickly.

Satellites are also being used to search for the source of the virus. Detailed vegetation maps of Congo and Gabon are being created. Particular environmental characteristics associated with infected sites will be evaluated. Epidemics usually occur at the end of the dry season or at the start of the rainy season. This annual

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Inside This Issue

Practice Guidelines

The following practice guidelines have been developed by the Clinical Laboratory Advisory Council. They can be accessed at the following website:
www.doh.wa.gov/lqa.htm

- Anemia
- ANA
- Bioterrorism Event Mgmt
- Bleeding Disorders
- Chlamydia
- Diabetes
- Group A Strep Pharyngitis
- Hepatitis
- HIV
- Infectious Diarrhea
- Intestinal Parasites
- Lipid Screening
- Point-of-Care Testing
- PSA
- Rash Illness
- Red Cell Transfusion
- Renal Disease
- STD
- Thyroid
- Tuberculosis
- Urinalysis
- Wellness

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periodicity of the outbreaks suggests particular ecological conditions that could characterize the reservoir host habitat.

Ebola is a member of the Filoviridae family and is similar to the Marburg virus. This negative stranded RNA virus has an average length of 920 nm and a diameter of 80 nm.

Incubation varies from two days to four weeks and is characterized by sudden high fever, prostration, myalgia, arthralgia, abdominal pains and headache. These progress to vomiting, diarrhea, oropharyngeal lesions, conjunctivitis, damage to kidneys and liver, and bleeding both internally and externally. The virus has a very specific tropism for liver cells and cells of the reticuloendothelial system, e.g. macrophages.

Because Ebola is spread through direct contact with blood or other bodily secretions, specimens have to be handled in BSL-4 containment facilities. Only two laboratories in the US can safely work with Ebola, CDC and USAMRIID. In May, a Russian researcher died from Ebola after accidentally sticking herself with a needle. This occurred at their State Research Center of Virology and Biotechnology (Vector). Apparently she was working on an Ebola vaccine.

ELABORATIONS is a free monthly publication of the Washington State Department of Health (DOH) Public Health Laboratories (PHL) and Office of Laboratory Quality Assurance (LQA).

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NOTE: Letters to the editor may be published unless specified otherwise by the author.

Website addresses:
DOH home page: http://www.doh.wa.gov
LQA home page: http://www.doh.wa.gov/lqa.htm
PHL home page:
http://www.doh.wa.gov/EHSPHL/PHL/default.htm

ELISA tests are often used to diagnose the viral infection. Antibodies have been found that bind to the nucleoprotein, the envelope protein, and the secreted envelope glycoprotein. Electron microscopy and PCR are also used on pathology specimens.

Interestingly, a blue-green algae produces a protein, cyanovirin-N, that partially inhibits Ebolaís ability to bind and infect cells by attaching to sugar molecules on the viral surface and thus inhibits the virusí ability to cross the cellular membrane (Barrientos, et al, *Antiviral Res*. 58: 47-56, 2003). The research demonstrated that the death of Ebola infected mice was delayed with daily subcutaneous injections of cyanovirin-N.

Government scientists using genetic engineering have developed a new vaccine against the virus that works rapidly after a single injection. It has been proven to work only in monkeys so far, which were completely protected. It was created by genetically manipulating Adenovirus to make it look like Ebola. Unfortunately, some of the population would already have a natural immunity to Adenovirus that could prevent the vaccine from working. The vaccine could be ready for human distribution as early as 2006.

There is not much information on the bioterrorism potential of Ebola, but a virus has to be airborne to be effective. And it would have to be transported in a way as to not be a risk to the terrorists themselves. According to Ken Alibek, a former Soviet biological warfare researcher, Ebola was evaluated as a biological weapon by the Soviet Union. It is unclear how many people could be killed if it were weaponized, but it would create mass panic.

For further information on the Ebola virus and similar viruses visit: www.cdc.gov/ncidod/dvrd/spb/mnpages/dispages/ebola.htm or www3.baylor.edu/~Charles_Kemp/ebola.htm.

To read an interview with the first person to view Ebola under a scope (Dr. Frederick Murphy) visit: www.accessexcellence.org/WN/NM/interview_murphy.html

Shipping & Handling of Biohazardous Materials Training Class

DATE, TIME & LOCATION: September 22, 2004 from 8:15 a.m to 12:30 p.m at the DOH Public Health Laboratories in Shoreline, WA.

COURSE OBJECTIVES: Due to the changes in the hazardous shipping regulations, this workshop is being offered in order to update laboratory professionals. If your lab transports specimens or cultures via the US Postal Service, private vehicle (public health nurse), or overnight air (FED EX, Airborne Express) then you will want to attend this course. According to the Department of Transportation, employers must certify the training of their employees that ship hazardous materials.

Tuition: $85.00 if registered on or before September 15, 2004 or $95.00 thereafter.

Shipping and Handling of Biohazardous Materials Training Course Registration Form

Name:_____

Employer:_____

Employer Address:_____

City:_____ State: _____ Zip:_____

Work Phone:_____FAX:_____

E-mail:_____ Message Phone:_____

Blood Cell Morphology Training Class

DATE, TIME & LOCATION: September 9, 2004 from 8:00 a.m to 3:00 p.m at the DOH Public Health Laboratories in Shoreline, WA.

COURSE OBJECTIVES: The lecture section of this one-day course will cover the following subjects: selected cases involving WBCs, RBCs, and/or platelet pathology; and examination of red and white cell morphology using Kodachrome slides. The laboratory section will include examination of actual case slides and examination of unkonwn specimens to test your abilities

Tuition: $105.00 if registered on or before September 2, 2004 or $115.00 thereafter.

Blood Cell Morphology Training Class Registration Form

Name:_____

Employer:_____

Employer Address:_____

City:_____ State: _____ Zip:_____

Work Phone:_____FAX:_____

E-mail:_____ Message Phone:_____

HOW TO REGISTER: Complete the registration form and mail to the **Department of Health, Training Program, 1610 NE 150th Street, PO Box 550501, Shoreline, WA 98155-9701** or Fax to **206-361-2904** or e-mail to **phl.training@doh.wa.gov** A registration form is available at our web site: **www.doh.wa.gov/ehsphl/phl/train/htm**. DO NOT SEND MONEY WITH YOUR REGISTRATION FORM.

West Nile Virus

√ **DEET** is an effective ingredient to look for in insect repellents. Always follow label instructions carefully.

√ **DUSK & DAWN** are when mosquitoes are most active, so limit outdoor activities or take precautions to prevent mosquito bites.

√ **DRESS** in long sleeves and pants during dawn and dusk or in areas where mosquitoes are active.

√ **DRAIN** standing water around the house twice weekly. Itís where mosquitoes lay eges. Include tires, cans, flowerpots, and toys.

√ West Nile Virus disease is rare, but if you have symptoms including high fever, severe headache and stiff neck, contact your health care provider immedi ately.

Washington State Department of Health
www.doh.wa.gov/wnv

West Nile Virus hotline: 1-866-78VIRUS

Calendar of Events

PHL Training Classes:
(http://www.doh.wa.gov/EHSPHL/PHL/train.htm)

Basic Blood Cell Morphology
September 9 Shoreline

Handling & Shipping of Biohazardous Materials
September 22 Shoreline

Northwest Medical Laboratory Symposium
October 20-23 Portland

11th Annual Clinical Laboratory Conference
November 8 Seattle

2005 WSSCLS/NWSSAMT Spring Meeting
April 28-30, 2005 Spokane

Contact information for the events listed above can be found on page 2. The Calendar of Events is a list of upcoming conferences, deadlines, and other dates of interest to the clinical laboratory community. If you have events that you would like to have included, please mail them to ELABORATIONS at the address on page 2. Information must be received at at least one month before the scheduled event. The editor reserves the right to make final decisions on inclusion.

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